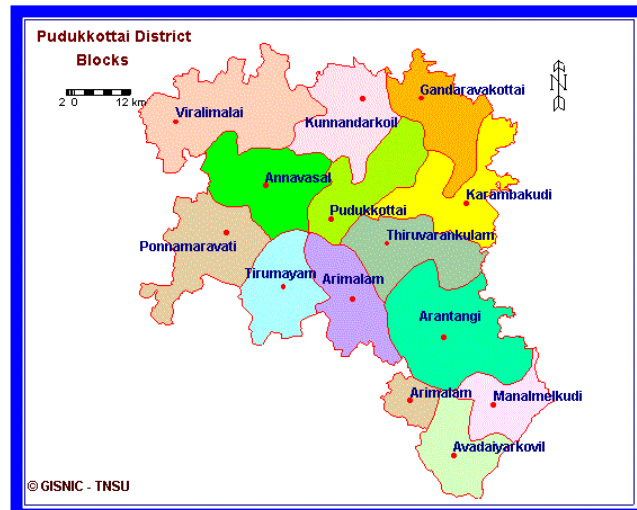
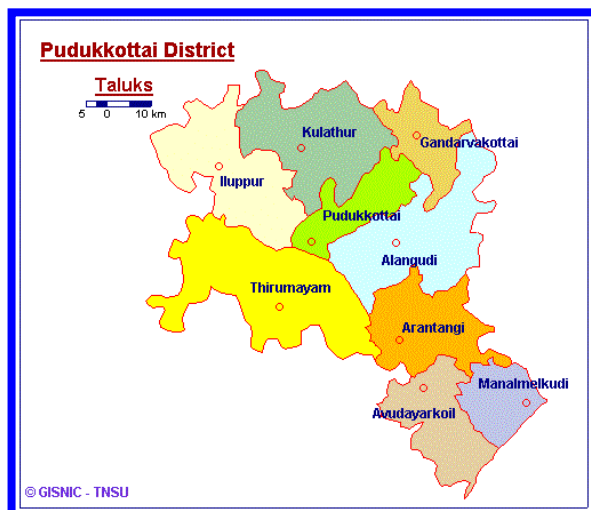


ENVIRONMENTAL PROFILE OF PUDUKOTTAI DISTRICT



1. INTRODUCTION

1.1 The Context

Tamilnadu has been endowed with multitude of natural resources. It is essential to manage these resources judiciously in order to achieve a sustainable development in all sectors. The current opinion and inferences aired on environment and natural resources including land, soil, water, air, and the life support system like forests, indicate that these systems are threatened by serious levels of degradation. But information relating to individual sectors lie fragmented. To manage the environment in a holistic manner and to develop an environment friendly sustainable development perspective, it becomes necessary to identify the gaps in the present management of resource bases. This warrants a strong data-base on the environmental matters of the state.

Towards realising this goal, an initiative has been taken by the Directorate of Environment, a nodal agency for management of environment issues in Tamil nadu. The purpose of such an initiative is to collate information on resources' use in various sectors that have greater bearing on environment in general and on the quality of life of the people in particular. It is considered appropriate to build a database on environmental status for each district, as it is a unit of

administration. The Directorate has launched the project of preparation of district environmental profile with the twin objectives of

- ◆ Providing a bench mark information system to develop an environment action plan in future.
- ◆ Opening up avenues for formulating a framework for Tamilnadu's Environmental Status Report.

1.2 Aspects of the study

Environment encompasses a wide area involving almost all field of living beings and their surroundings. These aspects can broadly be brought into the following categories:

- ◆ Basic information about the district,
- ◆ District's natural resources, S
- ◆ Environment factors and their status and
- ◆ Environment information.

These broad categories include the following aspects:

Natural Resources like soil and mineral resources , water, land use, flora and fauna, wet land habitats, potential hot spots, population and its characteristics

The use pattern and the trends of afforestation , population , soil and water conservation, protection of wild life and conservation of natural environment, Environment stress in respect of exploitation of resources, incidence of natural disasters, air, water and soil pollution, industrial effluents, wastes and sewage disposal, density of population, growing urbanisation and slum development, availability of drinking water, housing and toilet installations;

Environment impact on

- ecology , environment in proportion to generation and exploitation of natural resources
- population, pollution, health hazards.
- environment and tourism development
- urban services, their impact on environment improvement

- energy development, energy consumption and exploitation , their impact on environment
- information about environment institutes, environment NGOs.

1.3 Field Operation

Detailed data sheets have been prepared and provided by the Directorate of Environment for each aspect of environment to obtain secondary level data by approaching various government departments, and nodal agencies.

With the detailed data sheets, the respective departments and directorates at state level were contacted to obtain relevant data. Wherever applicable and necessary, district level offices were also contacted to obtain the required data/facts. In case of departments like meteorology, geology etc. their regional offices were visited to obtain the basic figures. During such visits, discussions with the official concerned were held on the nature and trend of the data available with them and their opinions on such trend status to accommodate genuine field level intricacies. In majority of the departments, there were procedural delays and also limitations on the data availability and access to the data. A sample level cross verification of such data collection need to be organised to ensure quality and standard in data collection.

1.4 Study Period

The period of reference for the study varies for each aspect depending upon its significance and availability. However, the aspects that are involved in trend analysis have basic data since 1951. The latest data availability period pertains to 1995-96.



2.GENERAL PROFILE

2.1 Historical background

Pudukottai was formerly a princely state ruled by Rajas with the title “Thondaimans”. The present Pudukottai district came into existence on 14-1-1974 encompassing the entire princely state of Pudukottai and parts of Thiruchirapalli and Thanjavur districts. The former princely state extended over Pudukottai taluks with Pudukottai town as its headquarters.

In sangam literature like “Agananooru” and “Purananooru” a few villages of this district like Kodumbur, Oliamamangalam and Edayathur find a mention. The district was a part of the Chola Kingdom till the 15th century and later on Muslim rulers, Naickers and the Marathas who ruled the Cholamandalam exercised control over Pudukottai too till the 17th century. Then it came under the authority of Thondaiman kings till it was merged with independent India.

The early settlers of Pudukottai region are considered to be Kurumbar whose descendants can still be seen in Sellakudy, Avanipatty, Vaishinkoil and Thennankudi villages. Inscriptions at Thirukogarnam, Tirumayam, Kudumiyamalai, Malayakoil, Sithannavasal and Narthamalai indicate about the flourishing foreign trade that prevailed even before 1st century B.C.

2.2 Administrative set up

Pudukottai district has an area of 4657 sq km. The district lies in between 9° 50' and 10° 40' north latitude and 78° 25' and 79° 15' east longitude. There are two Revenue divisions namely Pudukottai and Aranthangi. The boundaries of this district are Thanjavur district in north, Sivagangai in south, Trichirapalli in the west and Bay of Bengal in the east. The administrative units of the district consists of both revenue villages and village panchayats besides townpanchayats and municipalities. Pudukottai district comprises 7 taluks, 13 blocks and 765 villages. As regards to the hierarchy of administrative arrangement, there are 2 municipalities, 8 town panchayats and 498 village panchayats in the district. The details regarding talukwise number of blocks, villages, village panchayats, town panchayats and municipalities are given in Table 1.

Taluk	Block	R.Village	Panchayats	TP	Municipality
1.Pudukkotai	1	41	28	-	1
2.Gandharvakottai	1	35	36	-	-
3.Thirumayam	3	148	107	2	-
4.Alangudi	2	123	87	3	-
5.Aranthangi	1	96	52	-	1
6.Kulathur	3	162	125	3	-
7.Avudaiyarkoil	2	160	63	-	-
Total	13	765	498	8	2

2.3 CLIMATE

2.3.1 Temperature

The climatological features of the district have been observed from the meteorological station at Kudimianmalai, maintained by Agricultural Department. The features are given in the table below.

Factors	S.W. Monsoon	N.E Monsoon	Winter	Summer
Monthly temperature max / min (° C)	31.8/29.9	28.3/25.4	27.4/25.7	32.4/29.3
Temperature (° C)	30.8	26.7	26.5	31.2
Relative Humidity (%)	72.5	80.3	78.2	73.3
Wind speed (Km/Hr)	9.8	4.57	4.1	5.2
Sunshine (hrs/day)	6.0	5.6	8.76	8.57

2.3.2 RAIN FALL

The normal rainfall for the district has been 800 mm. However, during the two decades the district has experienced rainfall only below normal. Most of the rains occur during north east monsoon. The seasonwise rainfall details for the year of 1995-96 given in the following table.

Seasonwise rainfall : 1995-96		
Season	Normal (mm)	Actual (mm)
South west	393.9	79.0
North east	404.7	101.0
Winter	52.3	19.0
Hot weather	132.4	16.0

The monthly average rain fall of the district was 77.13 mm in 1991-96. The heaviest rainfall in the district used to be received in the month of November

(162.2mm). The average humidity is 75.8%. The relevant meteorological information for Pudukkottai district is given in Table 2.

2.4 Demography

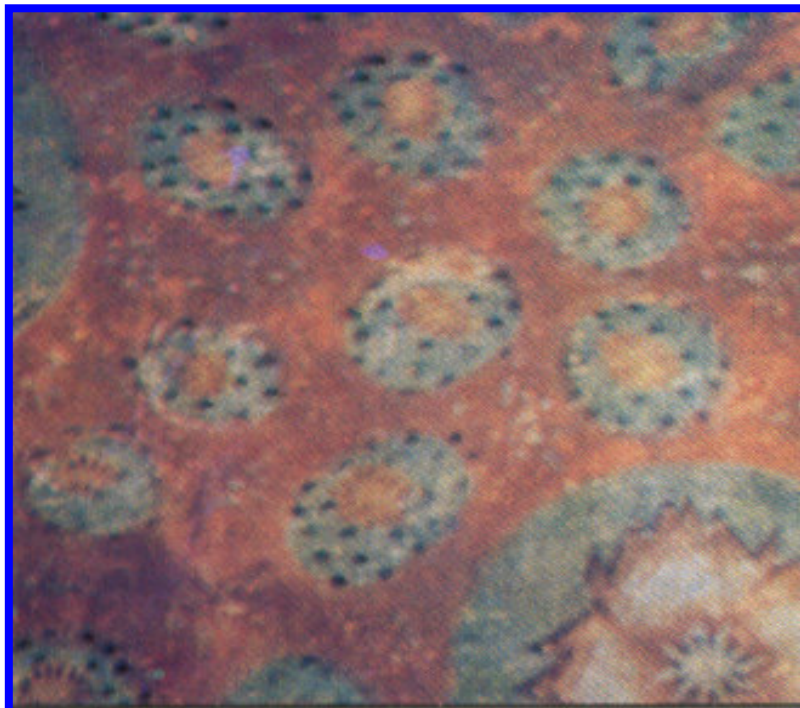
The population growth of Pudukkottai district over the four decades (1981-91) and the salient characteristics of the population like birth rate, death rate, infant mortality rate and level of literacy are presented in the following sections (Refer Tables 3,4 and 5)

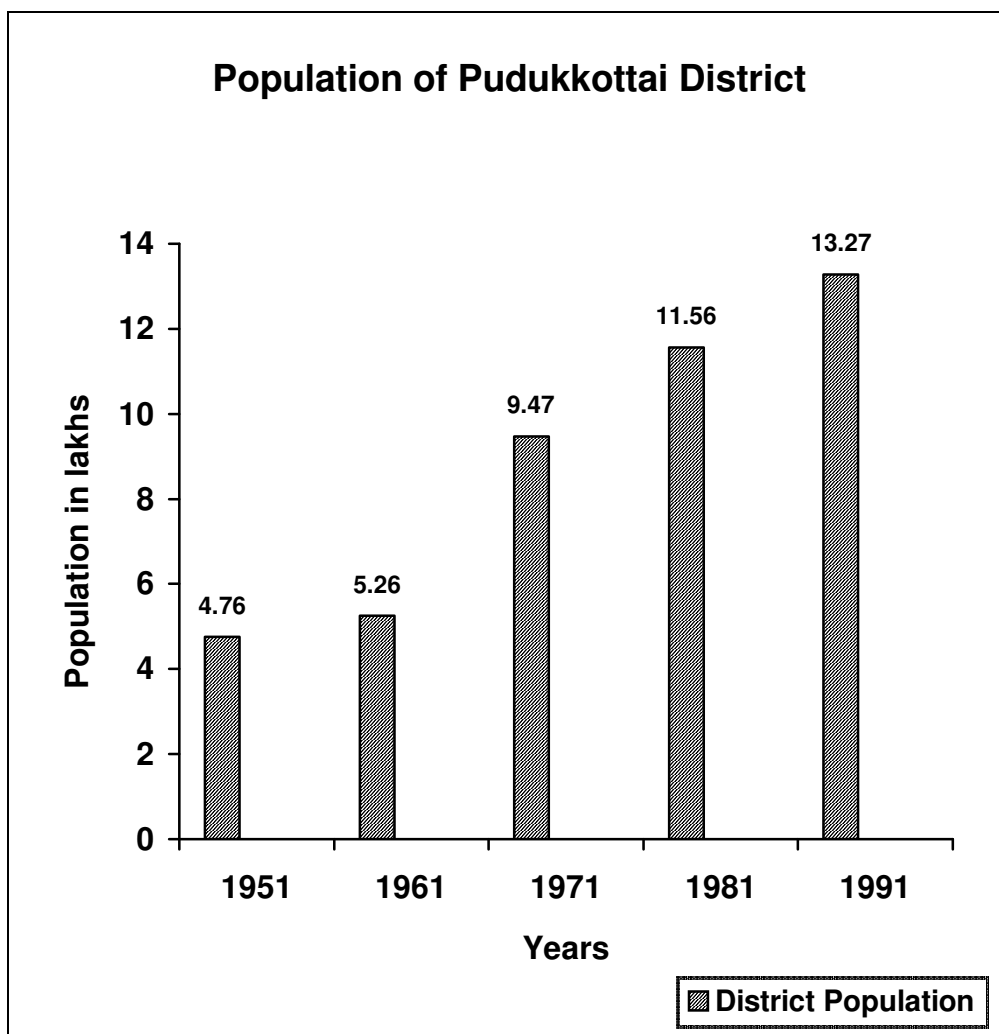
2.4.1 Population

Pudukkottai district has experienced an average decadal growth rate of 31.8% during the period 1951-91. The total population for the district in 1951 census was only 4.8 lakhs whereas, it has grown to upto 13.3 lakhs in 1991.

Kulathur, Alangudi and Tirumayam taluks are the most populous ones having more than 2.3 lakhs population each as per 1991 census. Gandharvakottai taluk has the least population of 71,700. Talukwise decadal population is given in table below. (Table 3)

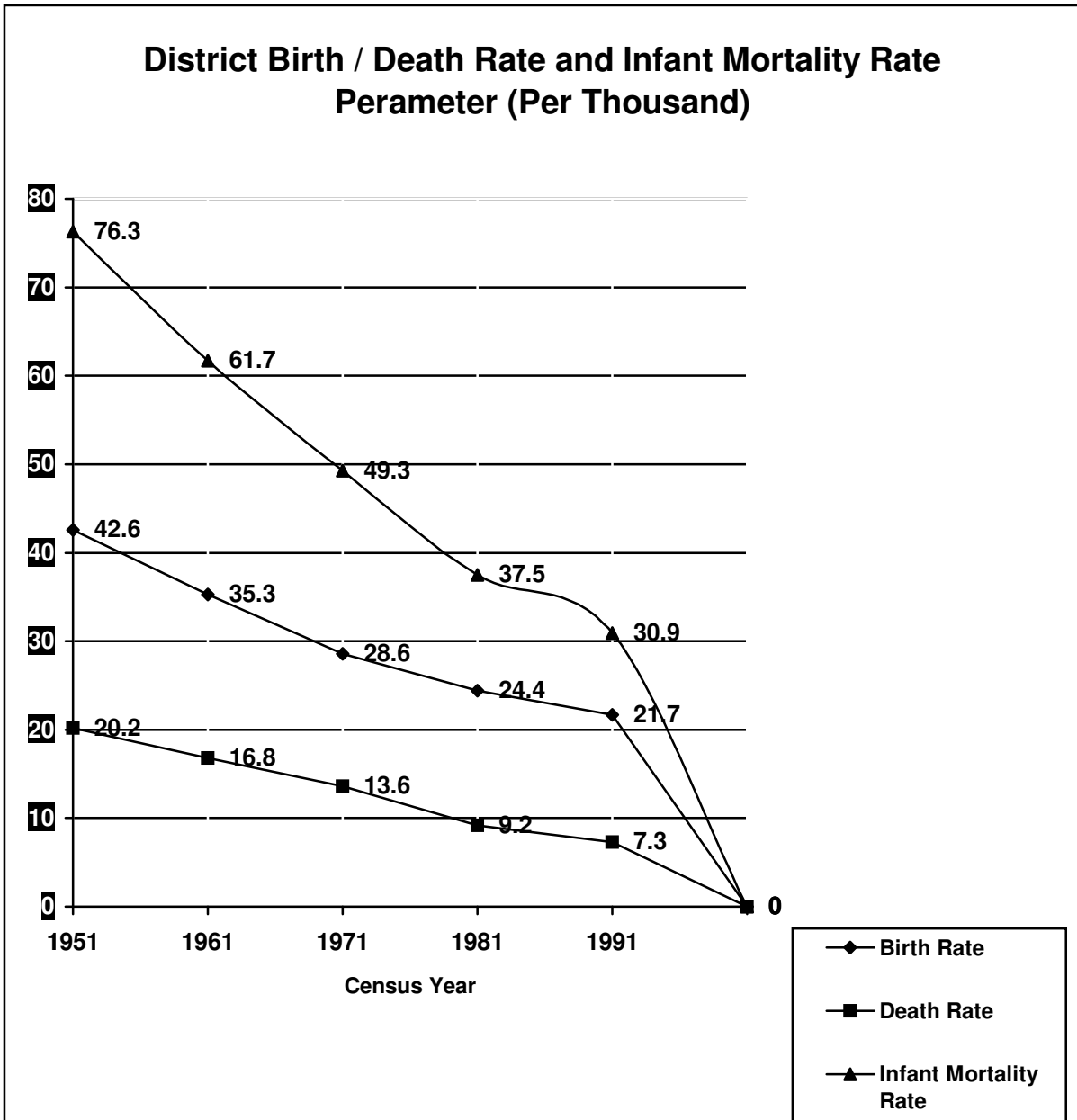
Taluk	1991
Pudukkotai	176657
Gandharvakottai	71700
Thirumayam	229108
Alangudi	235708
Aranthangi	173878
Kulathur	299480
Avudaiyarkoil	140617
Total	1327148





2.4.2 Trend in Birth/Death Rate and Infant Mortality Rate

The birth rate for Pudukkottai district is 21.7 in 1991 which is nearly half of the rate as compared to the birth rate in 1951. The first three decades showed a significant decline in birth rate. In respect of death rate the decline is gradual every year and the death rate is only 7.3 in 1991, which is below the state average. The infant mortality rate has also come down from 76.3 (1951) to 30.9 (1991). (Table 4)



2.4.3 Literacy Level Among the Population

The literacy rate in Pudukkottai district as per 1981 census was 38.7 hardly a little over a third of the total population. In the next decade, the rate has increased to 49.7 (1991 census). Similarly the estimated figure for 1996 is also higher at 51.8%. Only 43.6% of total women population in the district are literates as per 1996 projections. (Table 5)

LITERACY, 1991	
Total population	1327148
% literates	49.7
% male literates	61.7
% female literates	37.7

3. Resource - Availability, use and Environment status

3.1. Land Resources

The total geographical area of the district is 4657.24 Sq.km., the biggest taluk area wise being Kulathur and the smallest Pudukottai. Taluk-wise geographical areas are,

Taluk	Area sq.km.
Pudukkotai	284.06
Gandharvakottai	604.94
Thirumayam	664.60
Alangudi	717.43
Aranthangi	419.91
Kulathur	1322.94
Avudaiyarkoil	643.36
Total	4657.24

3.2 Land use pattern

3.2.1 Forests

Reserved forests and reserved lands occupy 237.13 sq.km., as per 1995 - 96 data and account for 5.09% of the total area. (Table 6)

3.2.2 Other land uses

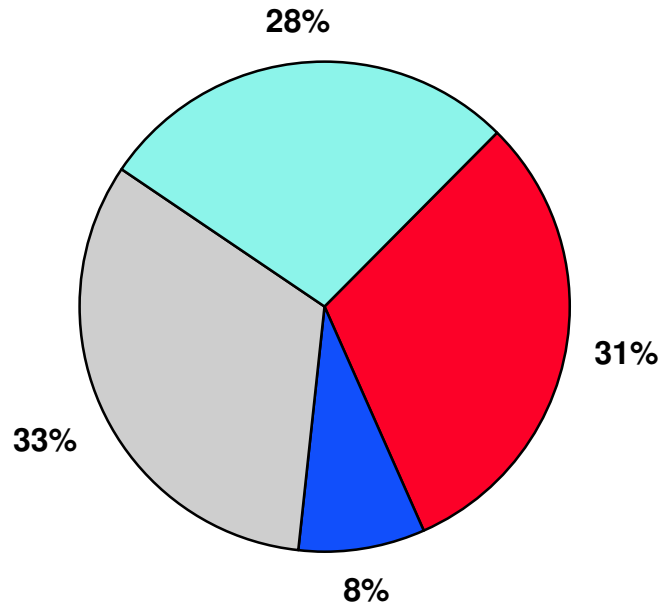
Non forest areas put to other uses are as follows:

Category	Area in sq.km.,	% of total area
Lands not available for cultivation	1368.84	29.39
Other cultivated lands	358.97	7.71
Fallow lands	1447.89	31.09
Net area sown	1244.61	26.72

The land utilisation pattern is illustrated in the pie chart:

Land use Pattern, 1995-96

■ Land not available for cultivation ■ Other uncultivated lands
■ Fallow lands ■ Net area sown



4. Agriculture

4.1 Soils

The major soil types, in the order of their extent, are laterite, mixed and red loamy types. About one fourth of the soils suffer from one problem or other, the main problems being salinity/ alkalinity. (Table 7 and 8)

4.2 Crops cultivated

The important cultivated crops are as follows :

Category	Common name	Botanical name
Cereals	<i>Rice</i>	<i>Oryza sativa</i>
	<i>Cholam</i>	<i>Sorghum bicolor</i>
	<i>Varagu</i>	<i>Paspalum scrobiculation</i>
	<i>Ragi</i>	<i>Eleusine coracana</i>
	<i>Maize</i>	<i>Zea mays</i>
	<i>Cumbu</i>	<i>Pennisetum typhoides</i>
Pulses	<i>Red gram</i>	<i>Cajanus cajan</i>
	<i>Cow pea</i>	<i>Vigna unguiculata</i>
	<i>Horse gram</i>	<i>Dolichos biflorus</i>
	<i>Black gram</i>	<i>Phaseolus mungo</i>
	<i>Green gram</i>	<i>Phaseolus aureus</i>
Oil seeds	<i>Ground nut</i>	<i>Arachis hypogaea</i>
	<i>Coconut</i>	<i>Cocus nucifera</i>
	<i>Gingelly</i>	<i>Sesamum indicum</i>
	<i>Soya bean</i>	<i>Glycine soya</i>
Condiments	<i>Chillies</i>	<i>Capsicum annum</i>
	<i>Tamarind</i>	<i>Tamarindus indica</i>
Sugars	<i>Sugarcane</i>	<i>Saccharum officinarum</i>
	<i>Palmyra</i>	<i>Borassus flabellifer</i>
Fibres	<i>Cottan</i>	<i>Gossypium hirsutum</i>

4.3 Natural area of principal crops

Though the areas under different crops vary from year to year, the normal areas of principal crops as assessed by the department of Economics and Statistics for this district are given below:

<i>Cereals</i>	<i>Rice</i>	<i>84,627 ha.</i>
	<i>Varagu</i>	<i>2841</i>
	<i>Ragi</i>	<i>1087</i>
	<i>Cholam</i>	<i>1076</i>
	<i>Maize</i>	<i>212</i>
	<i>Cumbu</i>	<i>68</i>
<i>Pulses</i>	<i>Red gram</i>	<i>2817</i>
	<i>Black gram</i>	<i>895</i>
	<i>Horse gram</i>	<i>529</i>
	<i>Green gram</i>	<i>115</i>
<i>Oilseeds</i>	<i>Ground nut</i>	<i>39474</i>
	<i>Gingelly</i>	<i>2447</i>
<i>Condiments</i>	<i>Chillies</i>	<i>360</i>
	<i>Tamarind</i>	<i>287</i>
<i>Sugars</i>	<i>Sugarcane</i>	<i>2253</i>
<i>Fibres</i>	<i>Cotton</i>	<i>263</i>

(Source: Season and Crop Report of Tailnadu for 1997-98-Fasli 1407-Department of Economics and Statistics)

4.4 Trends in production and Productivity

Though agriculture is the main source of sustenance for a majority of the population, the scenario is not quite encouraging. Dryland farming which is predominant suffers badly due to frequent poor monsoons, affecting agricultural production.

Cereals have shown fluctuations both in area cultivated and production from 1980-81 to 1995-96 while the largest coverage was in 1985-86 spreading over 127,174 ha the highest out turn of 314, 560 tonnes was achieved in 1993-94. The highest yield of 3030 kg./ ha was achieved in 1994-95. The area production and yield /ha. fell sharply in 1995-96.

While the largest area coverage, highest production and highest yield/ ha of pulses were achieved in 1985 - 86, the area, production and yield/ ha. dwindled and fluctuated in the subsequent decade.

Oilseeds area was the highest in 1993-94, but the highest production and yield /ha. were in 1992-93. (Table 9)

4.5 Consumption of fertilisers and pesticides

About 30,000 tonnes of chemical fertilisers and 58,000 packets of bio-fertilisers were consumed during 1995-96.

About 20 tonnes of dust formulations and 3610 litres of emulsifiable concentrates (liquid) formulations of pesticides were also consumed during that year.(Table 10 &11). While consumption of fertilisers and bio-fertilisers had registered a continuous upward trend, that of pesticides recorded wide fluctuations between 1980 and 1995.

4.6 Research and extension

At Vamban, a Pulses Research Station has been established by the Tamilnadu Agricultural University realising the key role played by this district in pulses production. Thanks to the efforts of this station, Soya bean cultivation is gaining popularity among the farmers.

At Kudumiyanmalai, a giant seed farm, a Farmer's Training Centre and an Agricultural School have been established.

5. Horticulture

5.1 Fruits

An interesting feature in the farm sector is the development of orchards using dry farming techniques and minimum irrigation in the formation stage. Banana is the main fruit crop under irrigation. The major fruit crops are,

<i>Banana</i>	<i>Musa sp</i>
<i>Mango</i>	<i>Mangifera indica</i>
<i>Jack</i>	<i>Artocarpus heterophyllus</i>
<i>Guava</i>	<i>Psidium guajava</i>
<i>Acid Lime</i>	<i>Citrus aurantifolia</i>

Jack, guava and acid lime are raised only on a very limited scale. Except for banana, the rest are raised on the red or lateritic soil belts.

During 1995-96, an estimated quantity of 132,000 tonnes of fruits was produced.

5.2 Vegetables

Brinjal (*Solanum melongena*) and ladies finger (*Abelmoschus esculentus*) are the two major vegetables cultivated here. During 1995-96, about 2,900 tonnes of vegetables were produced from 160ha.

5.3 Plantation crops-Cashew

A noteworthy feature of this district is the cultivation of cashew as a rainfed crop over extensive areas in the lateritic belt. However, no cashew processing unit has been established locally. The nuts are taken to numerous processing units that have

sprung around Panrutti in Cuddalore district. As per 1995-96 assessment, 25,765 ha. were under cashew with an out turn of 8500 tonnes of nuts. (Table 12)

6. Soil and water conservation measures

Table 13 summarises the various soil and water conservation measures implemented here upto 1995-96 in various panchayat union. The major works carried out are,

Construction of percolation ponds	131 nos.
Construction of check/stop dams	793 nos.
Soil and water conservation measures in cropping areas	29,537 ha.

7. Forest resources

7.1 Historical background

Major portion of the forests of this district was the personal preserve of the kings of Pudukottai state. Large forest areas were preserved as the hunting grounds for the rulers, their families and friends. With the merger of the princely state with Indian Union, in 1948, the control of the forests were transferred initially to the Revenue Department in 1948 and subsequently to the Forests Department in 1950.

7.2 Extent

Considerable variations are noticed in the area of forests reported by different sources at varying time. It is high time that the Departments concerned reconcile the figures across the table and arrive at an accepted figure. The differences are indicated below:

Source	Year	Area quoted (Ha)
Department of Economics & statistics (Season & crop report 1997-98)	1997-98	24.103
Forest Department 1995-96	1995-96	23713
Forest Department	1999	18469
Forest Department (Working Plan for Thiruchirapalli Forest Division by Dr.Aruna Basu Sarcar)	1999	21165

The figures of 23713 ha as quoted by the Forest Department for 1995-96 indicate that reserved forests and reserved lands constitute 5.09% of the geographical area, which is far below the state average of 17.49%. (Table 14)

According to the Working Plan of Dr. Aruna Basu Sarcar, most of the reserved forests and reserved lands has been leased to the Tamil Nadu Forest Plantation Corporation Ltd., (TAFCON) for raising plantations. An extent of 17842.42 ha of reserved forests and 436.92 ha of reserved lands have been leased out to TAFCON with only 301.89 ha of reserved forests and 2583.81 ha of reserved lands under the direct control of the Forest Department.

7.3 Flora Much of the natural forests has been converted into plantations by TAFCON. Only isolated patches of natural forests like Narthamalai R.F are being managed by the Forest Department and these forests support the following forest types:

Type 7C - 1 ----- Tropical dry evergreen forests and

Type 6 A - C2 ----- Southern Carnatic umbrella thorn forests.

7.3.2 Tropical dry evergreen forests

These forests are unique in nature and the floristic composition are as follows.

Characteristic species

- *Manilkara hexandra*
- *Mimusops elengi*
- *Albizia amara*
- *Memecylon umbellatum*
- *Diospyros ferrea syn maba buxifolia*

Top Canopy

- *Mimusops elengi*
- *Diospyros ebenum* (Occasional)
- *Strychnos nux vomia* (Occasional)
- *Strychnos potatorum* (Occasional)
- *Diospyros chloroxylon* (Occasional)
- *Drypetes sepiarea* (rare)
- *Syzygium cumini*
- *Canthium decocum* (frequent)
- *ziziphus glaberrima* (frequent)
- *Acacia leucophloea* (frequent)
- *Catunaregam spinosa* (frequent)
- *Buchanania lanzan* (Occasional)
- *Sapinda emarginatus* (Occasional)
- *Albizia amara*
- *Albizia lebbek*
- *Tamarindus indica*

- *Azadirachta indica*
- *Borassus flabellifer*

Under wood

- *Carissa carandas* (abundant)
- *Flacourtia indica* (locally abundant)
- *Diospyros ferrea* (frequent)
- *Grewia sp* (abundant)
- *Gymnosporia spp* (frequent)
- *Ixora arborea* (frequent)
- *Tarenna ascatica* (frequent)
- *Memecylon umbellatum*
- *Garcinia spicata*

Shrubs

- *Strobilanthus*
- *Dodonaea viscosa* (abundant)
- *Glycosmis pentaphylla*
- *Ochna squarrosa*
- *Gmelina asiatica*

Herbs

- *Hemidesmus indicus*

7.3.3 Southern Carnatic umbrella thorn forests

This is an economically important forest type supporting many valuable fuelwood species

Top canopy

Acacia planifrons
Albizia amara
Choloroxylon swietenia
Canthium dicoccum
Gyrocarpus jacquinu
Givotia rottleriforms
Sapindus trifoliatus

Under growth

Acacia latronum
Dichrostachys cinerea
Atalantia monophylla
Hemicyclia sepiaria

Shrubs

Randia dumetorum
Carissa spinarum
Zizyphus spp

	Acalypha fruticosa
	Barleria sp
	Soleannum toroum
Climbers	Pterolobium hexapetalum; Acacia pennata

7.4 Fauna

Eventhough forests of this district were the game resources of the former rulers and supported a variety of fauna, degradation have reduced the wildlife wealth. The animals commonly found are catalogued below:

Mammals	Bonnet macaque - <i>Macaca radiata</i> Jungle cat - <i>Felis chaus</i> Jackal - <i>Canis aureus</i> Small Indian civet - <i>Viverricula indica</i> Mongoose - <i>Herpestes edwardsi</i> Black naped hare - <i>Lepus nigrieollis</i>
Reptiles	Green whip snake - <i>Ahaetulla nasutus</i> Cobra - <i>Naja naja</i> Indian Krait - <i>Bungarus caeruleus</i> Russel's viper - <i>Vipera russelli</i>
Aves	Peafowl - <i>Pavo sp</i> Black drongo <i>Dicrurus adsimilis</i> Jungle and house crows Egrets Patridges

Around Viralimalai Murugan temple, Peafowls are seen in large numbers in tankbed plantations, private fields and atop trees. They breed and roam about freely because of the protection given to them by the forest Department and local population

7.5 Man made forests

The entire district abounds in cashew and Eucalyptus tereticornis plantations and the Arimalam series of Eucalyptus plantations is justly famous. TAF CORN has converted degraded natural forests into extensive plantations of cashew and Eucalyptus besides casuarina on a limited scale.

7.6 Social forestry

Under the auspices of SIDA Assisted Social Forestry Project, plantations have been raised in community lands like tank beds, poramboke lands, canal banks and roadsides. Upto the end of 1993-94, block plantations and strip plantations have been raised as detailed below:

Block plantings	Tankbed plantations	13417 Ha
	Poramboke plains	703 Ha
	Fodder plantations	59 Ha
Strip Plantings	Avenue plantations	312 Ha
	River and canal bank plantations	125 Ha
	Railway line plantings	42 Ha
	Tank bund plantings	8 Ha

7.7 Private plantations

Private entrepreneurs too have raised cashew Eucalyptus and casuarina plantations on a large scale under rainfed conditions. According to Season and Crop Report for 1997-98 the extents are, (Table 15)

Cashew	12126
Eucalyptus	2779
Casuarina	344

7.71 Trend in Per capita forest area

The per capita forest area has shown a declining trend from 0.051 hectares in 1951 to 0.016 hectares in 1996 due to a steady increase in population. The details are given in Table 16.

7.8 Ecological farm

An ecological farm over an extent of 30ha was established in Narthamalai R.F in 1987-88. The area was fenced and in 15 ha. the manual regeneration was assisted to reassert itself to achieve the original vegetation. In the other 5ha, which was barren, a variety of tree species was planted, assigning one small block to each species. (Table17)

7.8.1 wild life

There has been no serious effort by the concerned authorities to launch any specific wild life conservation programmes because of scare occurrence of wild fauna. (Table 18)

7.9 Details of villages abutting forest area

The villages located in the taluks of Thirumayam, kulathur and Pudukottai abut forest areas in the district. Out of these Thirumayam has number of villages abutting forest area. The details regarding the villages abutting forest area and their population are given in Table 19.

7.10 Tribal Villages

There is no designated tribal village in the district. (Table 20)

7.11 Forest areas diverted for non-forestry purposes

No forest area has been diverted for non-forestry purposes after the advent of the Forest Conservation Act of 1980. (Table 21)

7.12 Rare and threatened species

Rhyncosia velutina and santapura madurensis are the two plant species which have become vulnerable and endangered, respectively. (Table 22)

7.13 Data on out turn of forest products was made available. However cashew and Eucalyptus are the two major forest products in the district (Table 23)

8. Mineral Resources

The district has no significant mineral deposits. Stone quarries exist in Pudukkottai , Tirumayam and Kulathur Taluks: Multi-coloured stones, which are quarried and exported to as raw stones, are found in Kulattur Taluk in Narthamalai area.

There are 316 quarries in the district. Of these, 146 are leased out to private parties while 4 are leased to cooperatives.

Clay deposits occur in Gandharvakottai and part of Pudukkottai Taluks while red ochre and yellow ochre are reported in Tirumayam Taluk, though not in significant quantities. Terracotta clay is available in Mazhiyur village in Alangudi Taluk and is currently used for production of toys, grain storage bin and other clay articles.

Fire clay is available in Gandharvakottai Taluk.

Small quantities of quartz and limestone are reported in Vellakkalpatti and Meppusakudi while kankar is reported in Adhanakottai area.

The low mineral base of the district is evident in the mineral production profile, which comprises 12000 tonnes of rough stones and 300 tonnes of multi-coloured stones.

The recoverable mineral resources available in the district is granite of Kashmir white variety. However this has not been recovered so far here. (Refer Table 24).

9. SURFACE WATER

The district is one of the good rainfall regions with an average monthly rainfall of 118.0 mm. This has ensured a high percent of water table in the district as indicated by the following data for 1995-96.

Normal monthly rainfall	77.13
Normal annual rainfall	925.6
Actual annual rainfall (95-96)	485.9
Water table - low level	23.90m
Water table - high level	1.20 m

In Pudukottai district, Agniyar basin is the main source of surface water. Agniyar river basin consists of three sub basins, namely Agniyar , Ambuliyar and south vellar. There are seven tributaries in this basin. Agniyar is having three tributaries Viz Nariar I, Nariyar II and Maharajasamudram. The river Ambuliyar is having two tributaries, Viz Nerunjikudiar and Gundar. There are three gauging stations in Agniyar river basin maintained by PWD. (Table 25)

An important point to be noted in this basin is that there are no reservoirs across any of the rivers of this basin, the main reason being none of the rivers has copious flow. There is no direct ayacut fed by the rivers of this basin. There are about 3975 tanks in this basin by which 76350 ha are being irrigated. Out of the above, 346 are system and 3629 are non-system tanks. The approximate storage capacity of these tanks is 560 MCM.

9.1 Grand Anicut Canal (G.A.Canal)

Even though there are no reservoirs in this basin it is somewhat nullified by the supplementation of Cauvery water to part of the command area through G.A.Canal. It is supplementing the ayacut under 16 anicuts located in Agniyar, Ambuliyar and their tributaries. There are 74 tanks in Pudukottai District supplemented by G.A canal irrigating 5997 ha. The ayacut is located in Alangudi, Aranthangi and Avudayarkoil taluks of Pudukottai district.

River	Origin	Ayacut
Agniya sub basin A. Agniyar B. Maharajasamudram	Kulathur Tank , PDK Vallan, Tanjore	17304 6769
Vellar Sub basin A.Lower vellar	Tiruchi	24699
Ambuliyar sub basin		

A.Upper Ambuliar	Alangudi T.K , RDK	2676
Grand Anicut Canal	Couvery	5997

Agniyar, Ammliyar, South Vellar and GA Canar are the flowing water ,sources ofPudukkottai district. The total length of these streams in the district is 241.0 km and cover a basinarea of about 47,000 hectares.

The basinwise status of ground water availability in terms of average annual rainfall, gross recharge of the basin, net water utilised and balance water available for exploration is presented in Table 26.

9.3 Dams and reservoirs

No dams or reservoir is constructed in Pudukkottai district. (Table 27)

9.4 Irrigation of different Sources

Tanks are the main source of irrigation in the district. All the tanks are rainfed and the available water area for tanks is 60454 hectares. (1995-96). The total number of tanks available in the district in 1995-96 was 5451. The gross area irrigated by the tanks is 60613 hectares. Wells are the second major source of irrigation, irrigating 16511 hectares. Canal irrigation is available to raise crops in 9182 hectares. The blackwise details are given in Table 28 & 29.

9.5 Incidence of drought/Flood & Cyclone

No drought, flood or cyclone has been reported between 1985 and 1996. (Table 30)

10. Fisheries Production.

Pudukkottai district has a total coastal length of 42 kms, serving 29 coastal villages and towns. The fish production has increased both inland and marine - over the period 1986-96. 4000 tonnes of inland fish and 48000 tonnes of marine fish were produced in the year 1995-96. Rougnly 4000 fishermen are actively engaged in this activity. Inland fishery, largely a seasonal activity, is concentrated in tanks and ponds in Alangudi , Thirumayam and Kulathur Taluks. The fish varieties caught are gillnet, ray fish, Prawn, belone, silver bellies, octopus and crab. The details in fish production is given in Table 31 & 32.

11. Heritage Resource

Places of Religious Historical and Archaeological Importance including Places of Tourist Interest (Table 33 & 34)

11.1 Government Museum

The rare collections in the sections of Geology, Zoology, Painting, Anthropology, Epigraphy and Historical records are very interesting and informative. The beautiful bronze sculptures of various periods are really attractive pieces of this museum.

11.2 Sittannavasal

This ancient abode of Jains dating back to the 2nd century B.C. is about 16km. from Pudukkottai. It is the oldest uninhabited site in the District. The rock-cut cave temple with its beautiful frescoes and paintings in natural colours and stonebeds known as Eladipattam, a cave in which the Jain monks were said to have sought refuge in those days are the main attractions. There are a few sculptures of Jain Thirthankaras in the Ardhamandapam and the Inner shrine of the cave temple. The ceiling of the Ardhamandapam contains fresco paintings of the 7th Century A.D. Inscriptions of 9th-10th century A.D. are also found in the cave. The cave temple is said to have been excavated in the 7th Century A.D. by the Pallava king Mahendravarman. In the area around Sittannavasal, there are many historical burial sites consisting of kurangupatarai cairns, burial urns and cists.

Kudumiyanmalai

It is 20kms. from Pudukkottai. There are beautiful sculptures and a thousand pillar hall in the temple. There are as many as 120 inscriptions in the temple complex. The presiding deity is Sirkhagiriswarar. The temple is noted for numerous inscriptions, remarkable among them is the one relating to a musical treatise of Mahendravarman Pallavan who experimented the Sapthaswara in a veena called Parivardini with 8 strings. There is also a rock-cut temple called Melakkoil which was excavated during the time of Mahendravarman Pallavan.

11.4 Kodumbalur

This place also known as Muvarkoil is 36 km. from Pudukkottai and 42 kms. from Trichy. It was formerly the seat of Irukkuvellers who were related to Cholas. Out of the three shrines of Muvarkoil, only two exist now. These temples were built by Budiviramakesan in the 10th Century A.D. The architecture of this temple is unique among the South Indian temples. The sculptures of Kalarimurthi, Gajasamaharamurthi, Ardhanari and Gangadarmurthi are interesting masterpieces of art. This place was noted for the production of metal vessels and plates. Nearby is the Muchukundeswarar temple of the early Chola period.

11.5 Viralimalai

This town lies northwest of Pudukkottai about 40 kms. Throughout the district and even outside, this place is well known for the Subramaniam temple and is said to exist before 15th century A.D. The principal idol is seated on the peacock with his consorts on either side. Viralimalai has been mentioned in the Tamil book of hymns 'Thirupugazh'.

11.6 Narthamalai

This is a place of historical importance and the headquarters of the Muthuraiya Chieftains. The earliest structural stone temple, circular in shape, built by the Muthuraiyar and the Vijayalaya Choleeswaram cave temple built by the Vijayalaya Chola, the first king of the later Cholas are located here. The prehistoric burial grounds and the Kadambarmalai temple of this place are also of tourist importance.

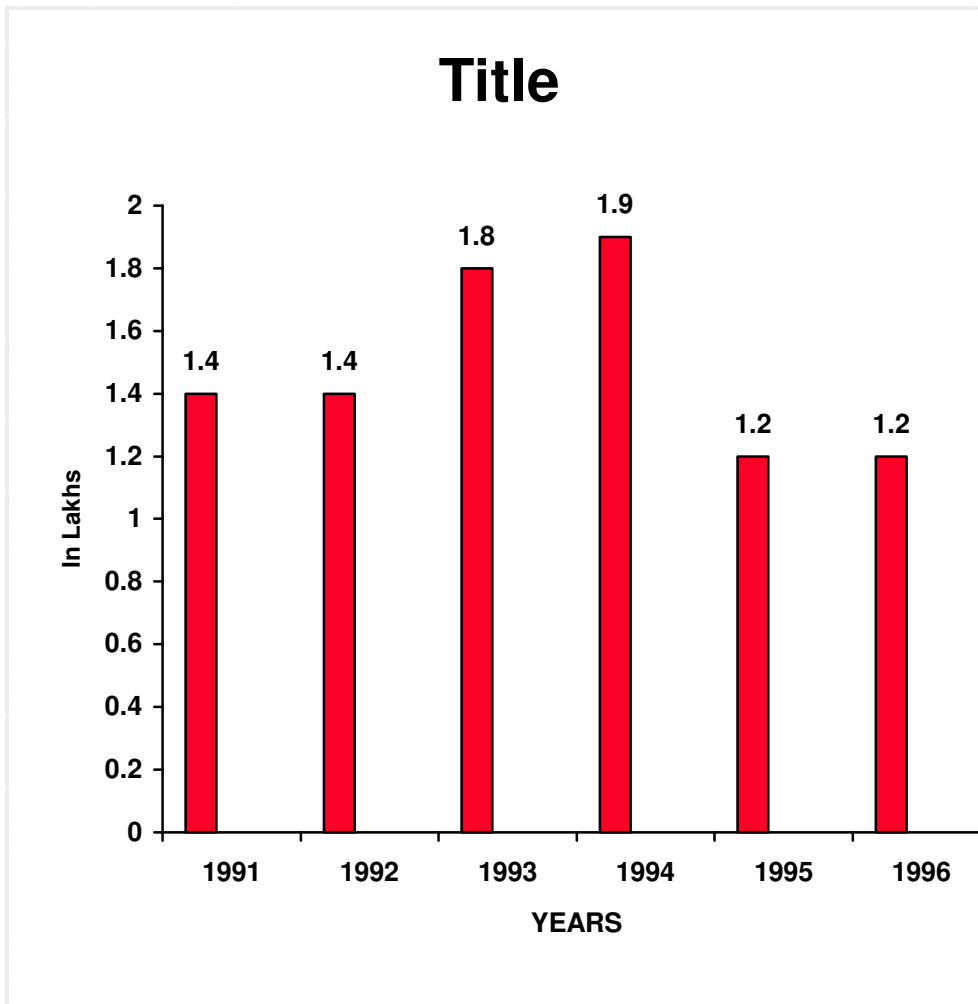
11.7 Tirumayam

It is one of the 108 Divyashetras sung in the Vaishnavite hymns, Divya prabhandam. It is also one of the 28 Vaishnava pilgrim centres. The fort, the Siva and Vishnu temples are the tourist attractions here. The famous Vaishnavite saint Tirumangai Alwar is supposed to have lived here before the 10th century. The ruins of an old fort exist here and it is said that the Poligar of Panchalankurichi was imprisoned in this fort before he was handed over to the British by the Tondaiman. The Sengirai forest near this palace is significant, for it is believed that this forest was the abode of the demoness Thadakai who was killed by Sri Rama. The fort played an important role in the history of Tondaiman rulers of Pudukkottai and the

British. The erection of this fort in 1687 AD is attributed to Sethupathy Vijayaraghunatha Tondaiman, the Sethupathy of Ramnad.

11.8 Tourist Arrivals

Information on tourist flow indicates that there has been a steady increase in number in the district between 1990 and 1994. In the later period the flow declined. (1994-96) (Table 35).



12. Energy Resources.

12.1 No power projects exist in the district. (Table 36)

12.2 Consumption of electricity.

The main source of power supply to the grid in the district are Trichy (230 KVSS); Thanjavur (110KVSS); KARAUKUDI (66KVSS) and Manapparai (66KVSS). The distribution within the district is managed through 14 sub stations in different parts.

The total electricity connections as on 1995-96 are 2.4 lakhs. Domestic and Industrial power consumption together constitute 71.9% of the total electricity used in the district. The category wise consumption of electricity is given in Table 37.

12.3 Electrification of Vilages

The district Pudukkottai has achieved cent percent rural electrification even in the year 1996 and nearly 39538 pumpsets were energised in 1996. The details are given in Table 38.

12.4 Non-conventional & Renewable Energysources Utilisation.

In respect of non-conventional & renewable energy sources, there are 2 units Solar Voltic Pumps of 2 HP capacity and 152 units of Biogas plants. As many as 8000 improved chullahs are constructed in the district. (Table 39)

13. INFRASTRUCTURE

13.1 Urbanisation

13.1.1 Urbanisation Pattern

The urban profile of the district unfolds with two municipalities and 7 town panchayats with an estimated urban population spread of 2.1 lakhs. The increase in urban population in the last two decades of 1981-96 is over 58,000. The urban population in the district accounts for 14.3% of the total population. (1996). The district urbanisation pattern is given in Table 40.

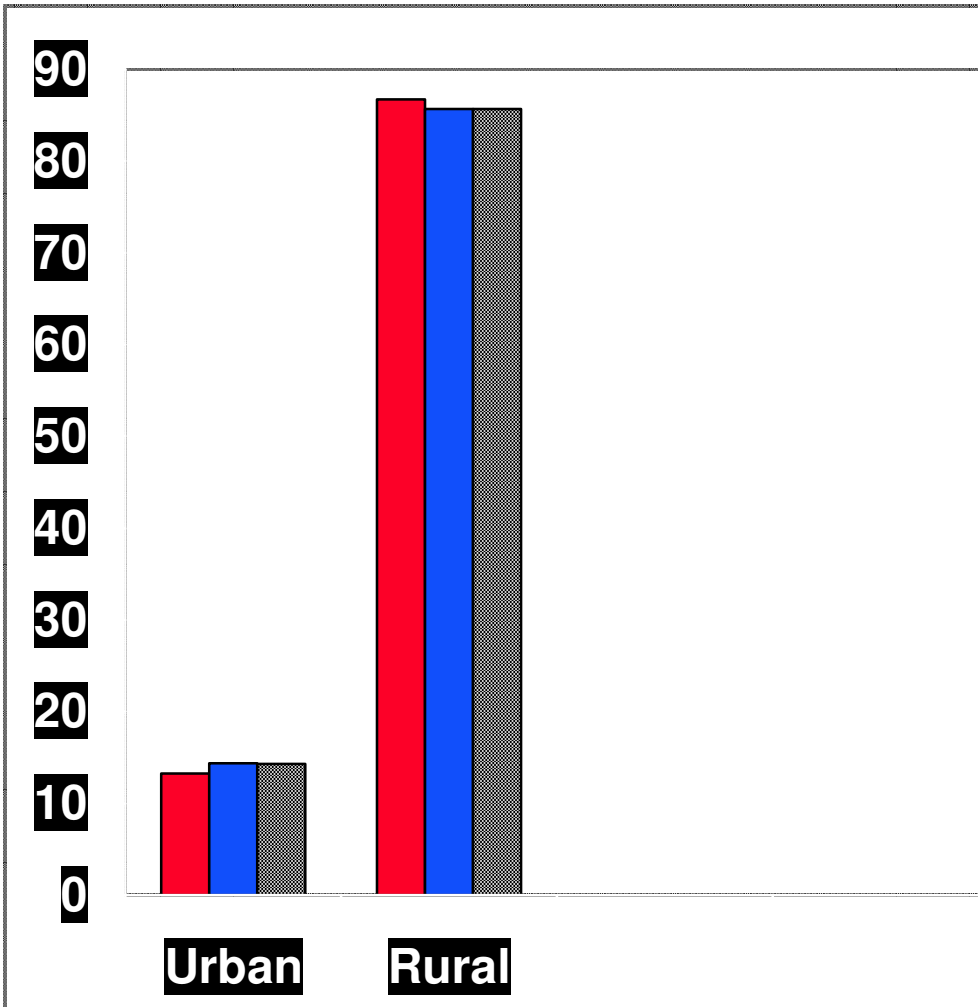
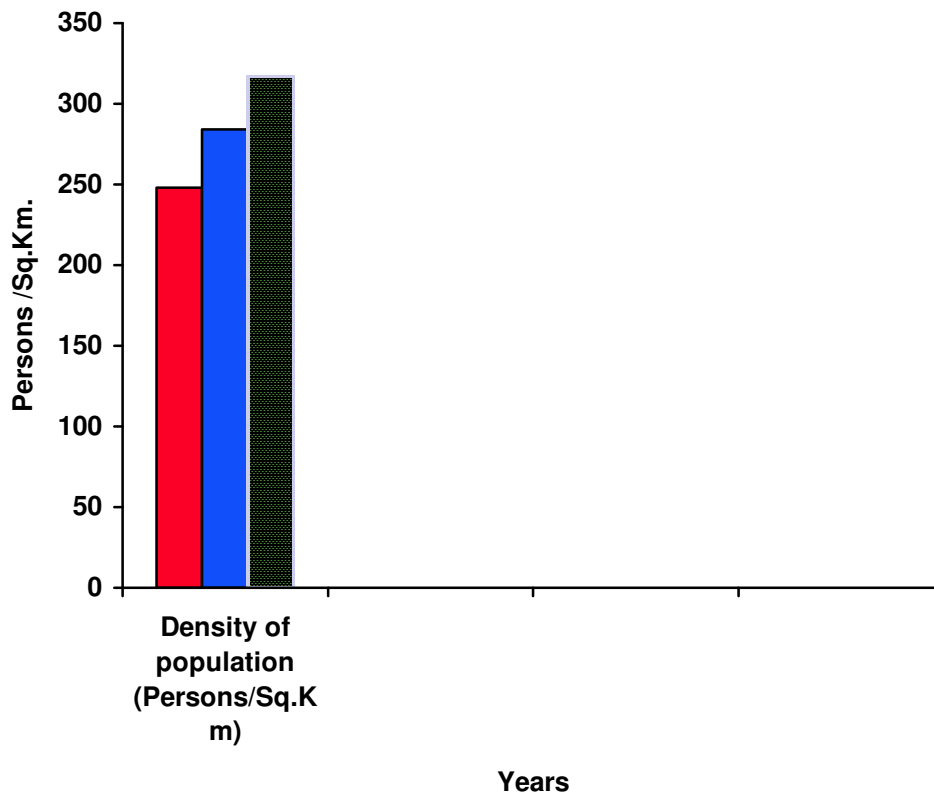


Figure 1

13. Density of Population

The overall density of the district population has registered an increase from 248 persons/sq.km to 317 persons/sq.km. The density of population was 3000 persons per sq.km in urban sites during 1996. (Table 41)

Density of Population in Pudukottai District



13.1.3

Decadal Growth rates in Urban Centres

The urban population has increased from mere 14000 in 1951 to 2.1.lakhs in 1996. The decadal growth rates indicates thjat during the period 1981-91 the number of urban centres have almost doubled. Initially in 1951, there were 2 municipalities and only 3 townpanchayats. But in 1996 totally there are 9 urban centres including the two municipalities. The next decade 1981-91 has recorded an increase in urban population at the rate of 43.38%.(Table 42 & 43)

13.1.4 Urban Slum Population

The recorded slum population in the district was arround 30,000 during 1991. No relevant data is available for comparative analysis of slum population over the period 1981-96. (Table 44)

13.1.5 Trend in urbanisation and slums

The trend in urban population in the district reveals that there is a slight increase in proportion of urban population over the years 1981-96. The increase is very much marginal at 1.1%.(Table 45)

14.RASTRUCTURE SERVICES AND ENVIRONMENTAL STATUS

14.1 Urban Services

14.1.1 water supply

Ground water is the major source of supply in the district and the designed capacity is 126.95 lakh litres. The average per capita water supply is 60 lpcd with a per capita water availability of 67 lpcd at municipalities. (Table 46)

Over 85% of the town population is covered by protected drinking water supply. The estimated sewage generation is 91.8 lakh liters. There is no underground sewage system. There is also no treatment plant in the district and therefore there is no organised disposal of sewage. (Table 47)

14.1.2 Municipal Solid Waste Generation

The total daily solid waste in urban areas of Pudukkottai district is 45.5 tonnes with a collection efficiency of 89%. Of these 25 tonnes are generated in Pudukkottai town itself. About 250 workers are engaged in solid waste management throughout the district. The details are given in Table 48.

14.1.3 Municipal Solid Waste Composition

Pudukkottai municipality alone has furnished the details on solid waste composition. The primary component of the waste is compostable matter and accounts for 85% of the total waste. (Table 49)

13.1.4 Coverage of Problem Vilages

Of the total 3289 settlements in the district, 2272 are fully covered under protected water supply and 1017 settlements are partially covered with protected with supply. (Table 50)

14.1.5 Occupied Housing Units

The total number of occupied housing units has increased from 1996-97 both rural and urban areas. There has been an increase in the number of households accessing piped water supply connection and toilet facilities in both rural and urban areas. However, larger proportion of households do not have any toilet installations. The details on occupied housing units are given in Table 51.

14.1.6 Reported cases of water borne diseases

Over a period of 10 years i.e., between 1987-96, largely reported water borne diseases have been gastroenteritis, Diarrhoea, and malaria. The reported incidence of death occurred only due to diarrhoea. (Table 52)

14.1.7 Facilities under Indian system of Medicines

Under Indian medicines systems, hospital and bed facilities are available for sidha and homeopathy. There are 12 hospitals with 958 beds (1995-96) that provide allopathy treatment in Pudukkottai district. There are totally 314 registered practitioners in various forms of medicines. (Table 53)

14.1.8 Population Below Poverty Line

96733 families are reported to be below poverty line in the district. Data for other years are not available. (Table 54)

14.2 Transportation

14.2.1 Development of Roads and Bridges

There is no national highway passing through the district. In respect of state highways, an additional length of 20km has been laid during the period 1981-96 bringing the total length to 188 km. Other district roads have been laid during the period for an approximate length of 700 km. There are 76 major bridges, 336 minor ones with as many as 4096 culverts in the district (1996) (Table 55)

14.2.2 Growth of Vehicle Population

The vehicle population in general has increased over eight times in the district. Four wheelers have registered a three fold increase in their population. Similarly, Two

wheelers have recorded a manifold increase in numbers from 1472 to 19347 (1986-96). The details are provided in Table 56.

14.3 Industrial Development and Environmental Status

14.3.1 Number of Industries

There is not much industrial activity in this district. There are only 29 large and medium units operating in the district while as many as 3000 units are reportedly working in the small scale sector. A major facility available to industrial enterprises in the district is the developed plots and built-up sheds provided by SIPCOT and SIDCO respectively.

SIPCOT complex

The SIPCOT complex is situated 7 km. From Pudukottai on the Pudukottai - Trichy road in an extent of 412 acres. Of this area, around 51 acres are allotted to SIDCO Industrial Estates where builtup sheds are made available to entrepreneurs.

SIDCO Estates

Built up sheds provided by SIDCO in its estates at Pudukottai and Madur. The major and medium units operating in the district are engaged in variety of activities ranging from food products to textiles to pressure valves and vessels. (Table 57)

Large/Medium Industrials units by activity	
Activity	Units
Cotton yarns	5
Chemicals	4
Boilers and pressure vessels	1
Valves and accessories	2
Plastics	2
Paper	1
Fasteners	1
Industrial fabric	1
Batteries	1
Alloys & steels	4
Magnetto starter	2
Nylon fishnet	1
Building equipments	1
Rice bran oil	2
Wheet products	1
Total	29

14.3.2 Emission Inventory Major Industries

Nil (Table 58)

14.3.3 Ambient Air quality Status

Nil (Table 59)

14.3.4 Air Pollution stressed area

Nil (Table 60)

14.3.5 Water quality

Data are not available for water quality of surface water. (Table 61)

14.3.6 Discharge of Industrial effluents

There are no reported air pollution areas in Pudukkottai district. Data are not available for ambient air quality status. (Table 62)

14.3.7 Noise levels

Data on noise levels are not available (Table 63)

14.4 Environmental Status Of Coastal Eco-System

14.4.1 Industrial development and Discharge of Industrial Effluents.

There are no Industrial units in the district that discharge effluents. (Table 64)

14.4.2 Aqua culture activities

The aqua culture activities practised in Pudukkottai district have been of semi intensive type. There are 50 such units covering 231 hectares of area. The details are given in Table 65.

14.4.3 Wetland Habitats, their use and Problems

There is no wetland habitat in Pudukkottai district . (Table 66)

14.4.4 Potential Hot Spots along the coast

The potential hot spot identified for the district is the seashore at Manalmelkudi. (Table 67.)

14.5 Environmental NGOs and Institutions

There are 16 NGOs rendering their services for creating environment awareness and campaigns. (Table 68)

14.5.1 Environment Education and Research Institutions

No such institutions is functioning in Pudukottai district. (Table 69)

15 Summary of Observations

The key observations of the environment profile of Pudukottai district are briefed below.

15.1 Demographic details

1. The district population has grown over 2.7 times during the period 1951-1991. As per 1991 census Kulathur Alangudi and Tirumayam taluks are the most populous taluks.
2. The birth rate had significantly decreased from 1951 to 1991. Nearly half of the rate as compared to the birth rate in 1951.
3. As per 1991 census the district literacy level increased considerably than the previous decade.

15.2 Land and resources

1. The utilisation of land area in Pudukottai district is upto 66% only. About 29.4% land are not available for cultivation.
2. Across the blocks, the usage of chemical fertilizers is uniform. But the usage of bio-fertilizers has increased significantly.
3. About 22% of the soil is reported to be suffering from salinity / alkalinity.

4. The percolation ponds and check dams has been constructed in all blocks of the district under soil and water conservation programmes .

15.3 Forest and other resources

1.Forest occupy only 5.09% of the total land area, but remain intact without being diverted for non-forestry uses. The percapita availability of forest is diminishing.

2. An Ecological farm over an extent of 30ha was established in Narthamalai R.F in 1987-88.

3. TAF CORN has converted degraded natural forests into extensive plantations of cashew and Eucalyptus besides casuarina on a limited scale.

4.The main source of irrigation in the district are tanks and wells. On an average 60% of the total cropped area are irrigated by these sources.

5.The recoverable mineral resource available in the district is Kashmir white granite variety.

15.4 Urban infrastructure

1. The urban population has increased from 1.14 lakhs in (1971) to 2.12 lakhs in 1996

2. There has been a steady increase in slum population.

3. The trend in urbanisation continues to show an increase. However, in municipalities, the slum population has registered an increase over the period 1991-96.

4. Ground water is the major source of protected water supply in the district and the designed capacity is 126.9 lakh litres. The urban settlements suffer from inadequacy of underground sewerage and treatment.

5. Overall solid waste generated in the district adds upto 45.46 tonnes. Organised disposal by way of composting is lacking in many urban centers.

6. The vehicle population in general has increased in Pudukottai district during the period 1986 - 1996.

15.5 Industries growth and Environment

1. Industrial growth is not much in this district. One SIPCOT complex near Pudukottai is functioning in an extent of 412 acres and one SIDCO estate is functioning in Madur .

2. Ambient air quality monitoring, water quality and emission monitoring of major industries are not taken up in the district so far.

3. Coastal waters do not face any serious problems from discharge of domestic or industrial waste at present.

4. There are 16 NGOs rendering their services for environmental issues.